

# Analysis of 5G Mobile Communications Industry Environment

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## Abstract

*With the rapid popularization of explosive smart terminals due to the increase in broadband, a high speed transfer rate can realize the need for 5G mobile technology . Future mobile service technology can accommodate mobile cloud and low-cost media realize an energy efficiency improved mobile communication environment. In addition to a variety of high-tech components, technology development and the convergence of fixed and mobile network/based on the service side of the CPND technical characteristics are required. In addition, the networking and wireless Internet 5G mobile communication system-related key technologies can be combined in a variety of technical characteristics, while 5G of technology convergence in the system should be developed in a way that can make it easier to combine with other technologies. 5G mobile communication system is the rate of transmission of holographic 3D 100Gbps that can transmit images to a mobile network.*

**Keywords:** *5G mobile service, mobile cloud, energy efficiency, CPND, wireless Internet, convergence, realistic 3D/4D/Hologram, Giga KOREA, lifestyle change*

## 1. Introduction

The explosive growth of smart media devices, IoT and wearable devices just as they are expected to be popularized by the year 2020 , expected to have 35ZB in data traffic. This is a high speed/high capacity/high quality media 5G mobile communication system that can accommodate the need to keep people entertained . 5G systems demand mobile cloud, 3D real media services, and energy efficiency and so on through convergence networking such as WLAN and WWCA. In addition, 5G systems demand a mobile network that has technical characteristics based on CPND (Content, Platform, Network, Device), and 4G-LTE (A) contrasts 1,000 times faster than 100Gbps of 3D holographic transmission rate can transmit images. Implementation of business models through these convergences USN global standard IEEE 802.11 to preempt research group, ITU-T, Standardization Strategy Analysis of 5G Mobile System METIS 2020 Consortium as the standardization activity. In Korea, opposite 5G technical Standardization Strategy Analysis of 5G Mobile System standardization through 'The 5G Forum' [1~4].

Smart media devices with the introduction of the explosive growth in data traffic became popularized fast (35ZB in 2020, M2M Terminal penetration increases within 10 years and 500 per traffic increases 20~120, etc.) due to the fact that the high speed/high capacity/high quality media raises new demand needs. This is a broadband, high-speed transfer rate that can realize the need for 5G mobile technologies. The development of the ICT industry in the first half as 5G system innovation is the key to the breakthrough of wireless communication technology in transforming the infrastructure and technological development worldwide, while the competition is intensifying. 5G mobile communication network aims to build integration through detection, storage, processing, USN, and the

ubiquitous information environment. Exponential increase in the next mobile services technology, smart media devices and M2M terminals, such as mobile cloud and popularized in the media realized that due to the number of mobile services changing rapidly diversified aspects yoni live a low-energy efficiency with enhanced mobile communications environment. In Korea by the end of 2015 Pre-5G to the end of 2017, 5G mobile technology demonstrations, trial implementation, and completion of the development of the technology by the 2018 Pyeongchang Winter Olympics will unfold a pilot project in December 2020 aiming to develop technology and commercial services on standardization. 5G mobile communication systems, the implementation of Korea's world-class ICT infrastructure and technical skills in graft of 5G will enable big ramifications through the surrounding industry.

## 2. 5G Mobile Communication System Driving Issue

During May 2015 to the present, wired & wireless telecommunication service subscribers may summarize briefly the current situation as follows [5]:

- Mobile phone subscribers of Korea total 57,765,248 persons; the number of smart-phones total subscribers are 41,669,694 people (72.1%). The total number of 4G-LTE (A) subscribers are 37,921,456 people (91.9% : SK Telecom 17,716,090, KT 11,373,698, LGU+ 8,831,668)
- Mobile communication technology by type the number of subscribers: CDMA 5,019,000, WCDMA 9,652,686, LTE 37,921,456 persons
- Wireless internet subscribers in total 52,472,590 persons (SK Telecom 26,213,045, KT 16,159,107, LGU+ 10,100,438)
- Subscribers of Tablet PC 564,617 persons (SK Telecom 225,378, KT 321,252, LGU+ 17,987)

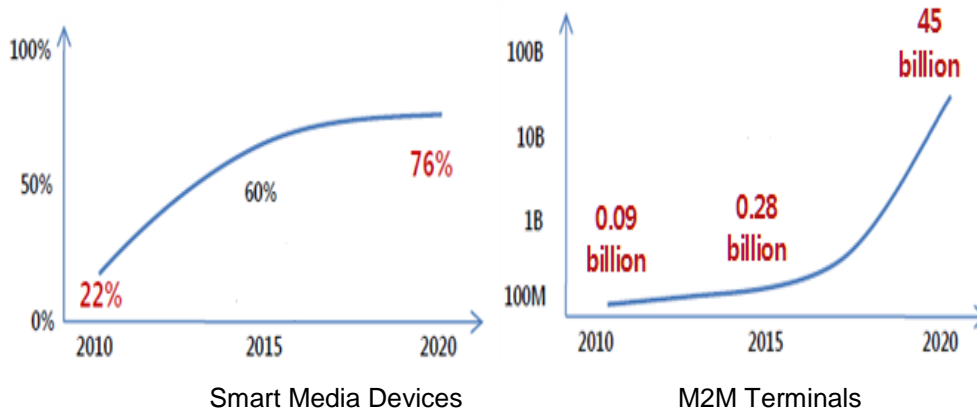
As the world's highest mobile environment surrounding user-based infrastructure. In particular, 4G-LTE (A) in the case of services, the entire Smart-phone subscribers number 63.5%, enough to take broad and holds a large number of users. (For the second quarter of 2014, the current world level 112 countries, there are about 2 million 8 thousand subscribers in the introduction stage level)

In 5G mobile systems, the definition of wireless Internet is wireless and mobility equipped through a mobile phone. 5G would like to implement in wireless mobile communication systems the scope of the Internet industry coverage and the app market rated classification system, expert opinion, in-depth analysis of a professional database, including all 4 categories (networks, system & terminals, solutions & platforms, contents), 24 of which were classified as category, 100 classification [6-8].

## 3. Global Trends of Mobile Services

Within the next 10 years, the world smart media device penetration rate is already at 3.5 times, with M2M devices is expected to increase to 500 times as much, to the extent that the data traffic is 20~120 times per terminal, while explosive growth is expected. The growth rate as smart media devices spread around the world are 22% in 2010, while an increase of 76% is expected in 2020 to the ongoing record. M2M terminal growth rate of spread is 90 million in 2010 and in 2020, as 45 billion is expected to increase rapidly. In addition, sensor-based information (traffic/weather control, *etc.*), media-centric services (CCTV, video transmission inter vehicles, *etc.*), and gradually expanding broadband is expected to be a high-volume M2M service [9-10]. (See Figure 1).

\* source: Jewon Cho (2014. 6), UMTS/IDATE/Cisco/Gartner(2014) data overall / recomposition.



**Figure 1. Trend of the Global Penetration of Smart Media Devices and M2M Devices**

Mobile video data of continuous growth (in 2010 52.8%, in 2015 66.4%) and UCC (User Created Contents), Full-HD-level 12 million PIXEL high quality of multimedia data, such as a-grade Smart-phone camera and was about 25 times due to increased [9,11-12].

#### 4. Environment Change of Mobile Communications

Wireless network management costs and increases demand, while small cell base station installation continues to increase as a result, the base station's wireless backhaul is being built. Globally, small-cell base stations and wireless backhaul number at 34,316 units in 2011, 1,306,297 units in 2014, and 3,553,282 units in 2016 are expected in the big market. In 2011~2016 small cell base stations sales are at an average of 120% the average annual sales of wireless backhaul, 304% is expected to continue to grow its broadband [9,13]. During 2011~2016, 'build trend of small-cell base stations & wireless backhaul' are indicated in Table 1.

**Table 1. Build Trend of Small-Cell Base Stations & Wireless Backhaul**

	2014	2015	2016	Total	CAGR [%]
small-cell [100unit]	601.8	1,073.3	1,671.1	601.82	120
wireless backhaul [100unit]	704.5	1,192.4	1,882.1	704.5	304
Total	1,306.3	2,265.7	3,553.2	60,886	212.00 (ave.)

\* source: Jewon Cho (2014. 6), Mobile Export (2012. 10) / recomposition.

#### 5. Standardization Trends and Strategy

A brief summary of related domestic 5G mobile communication system standardization trends show the following [13-14]:

- May 30, 2013, MSIP was launched about the technical standardization research through the established the '5G Forum'.
- TTA is in discussions with PG701 (IMT-Advanced), Korea ITU Research
- Committee (WP5D & JTG 4-5-6-7), Korea-China-Japan IMT Standard

#### Cooperation

- Conference.

In order to secure initiative, global standardization follows a step-by-step research of future IMT vision and technology and standardization as follows:

- Initial term (2012~2014): 5G system for vision and establish the technical requirements
- Middle term (2015~2017): 5G nominated technology development and evaluation
- End term (2018~2020): 5G global standard promoting and initial commercialization
- propulsion

## 6. Conclusion

5G standards focused on LTE-Hi version are also interested in standards development and research when there is a need to watch the situation. In the case of global standardization-related domestic 5G mobile systems standardization, quantitative growth is accomplished but qualitative growth still leaves much to be desired. 5G mobile communication systems are macro cell, micro cell, small cell and relay *etc.*, with various cell and communication modes being used. In addition, incorporating a wide variety of convergence technology can lead to a very complicated situation wherein mixed frequencies may be deployed. In such an environment such as high-capacity MIMO femto-cell system, moving to more efficiently utilize the frequency can be a very good step. In particular, frequency efficiency is the most important resource in mobile communication problems, because even in high-speed data transmission technology, universal cellular networks can be applied. Continuous technological research is needed to improve performance.

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